查询W91560DN供应商

3-MEMORY TONE/PULSE DIALER WITH RTC AND LCD DISPLAY FUNCTIONS

GENERAL DESCRIPTION

The W91560DN series ICs are Si-gate CMOS ICs that provide the signals needed for either pulse or tone dialing. They feature 3 number memories and a 12/16-digit LCD driver for displaying telephone numbers and calling time. A real time clock is included to display the time of day. The W91560DN series is fabricated using CMOS technology and thus provide good performance in low voltage, low power applications.

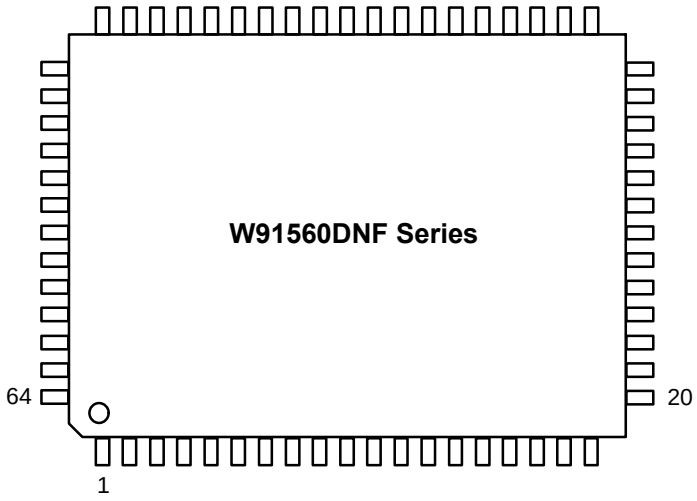
FEATURES

- One by 32 digits for redial
- Three by 32 digits for one-touch direct repertory memory
- Uses 5 × 6 keyboard
- Pause, Pulse-to-tone (*/T) can be stored as a digit in memory
- Flash can be stored as a digit in memory when in store mode
- Minimum tone output duration: 87 mS (81 mS for W91564DNF and W91565DNF)
- Minimum intertone pause: 87 mS
- Tone/Pulse mode pin selectable
- Make/Break ratio pin selectable
- Dialing rate: 10 ppS
- Pause time: 3.6 Sec. (2.0 Sec. for W91564DNF and W91565DNF)
- Flash break time (73 mS, 100 mS, 300 mS or 600 mS) selectable by keypad
- Built-in 12 or 16-digit LCD driver (1/4 duty, 1/3 bias) selectable by mask option
- Built-in calling timer from [00:00] to [59:59]
- Memory check function
- On-chip power-on reset and clear LCD
- Uses 3.579545 MHz TV quartz crystal or ceramic resonator
- Uses 32768 Hz crystal as RTC frequency base
- Switchable 24-hour clock or 12-hour clock with p.m. mode by keypad
- 0 or 9 dialing inhibition pin for PABX systems or long distance dialing lock out
- On-hook debounce: 150 mS in normal mode and 20 mS in lock mode
- Off-hook delay 300 mS in lock mode ($\overline{DP}$ will keep low for 300 mS while off hook except the first off hook after power on reset that $\overline{DP}$ will keep high for 100 mS then go low for 200 mS)
- First key-in delay: 300 mS in lock mode
- Mixed dialing allowed
- Packaged in 64-pin plastic QFP with RTC
- The functions of the different dialers in the W91560DN series are shown in following table:

TYPE NO.	LCD DIGITS	LOCK	HOLD	PAUSE TIME
W91560DNF	16	---	Yes	3.6 Sec.
W91561DLNF	16	Yes	---	
W91562DNF	12	---	Yes	
W91563DLNF	12	Yes	---	
W91564DNF	16	---	Yes	2.0 Sec.
W91565DNF	12	---	Yes	
W91560DNH	16	Yes	Yes	3.6 Sec.
W91562DNH	12	Yes	Yes	

Note: W91564DNF/W91565DNF is only for the French market. The pause time will not be added when in pulse-to-tone function mode.

PIN CONFIGURATION



PIN DESCRIPTION

<table>
<tr><th>SYM.</th><th>PIN NO.</th><th>I/O</th><th>FUNCTION</th></tr>
<tr><td>Row, Column Inputs</td><td>18–21,
13–17</td><td>I</td><td>The keyboard inputs may be used with either the standard 5 × 6 keyboard, an inexpensive single contact (form A) keyboard or electronic input.
A valid key entry is defined by a single row being connected to a single column.</td></tr>
<tr><td>XT1,
$\overline{\text{XT1}}$</td><td>22, 23</td><td>I, O</td><td>A built-in inverter provides oscillation with an inexpensive 3.579545 MHz crystal or ceramic resonater.
The oscillator ceases when a keypad input is not sensed after the chip is enabled and dialing is finished. The crystal frequency deviation is ±0.02%.</td></tr>
<tr><td>T/P
$\overline{\text{MUTE}}$</td><td>8</td><td>O</td><td>The T/P $\overline{\text{MUTE}}$ is a conventional CMOS N-channel open drain output.
The output transistor is switched on low level during the dialing sequence (both pulse and tone mode), one-key redial break and flash break. Otherwise, it is switched off.</td></tr>
<tr><td>H/P MUTE</td><td>9
(W91560DNF, W91562DNF, W91564DNF, W91565DNF only)</td><td>O</td><td>The H/P MUTE is a conventional CMOS inverter output, During pulse dialing, one-key redial break, flash break and hold functions, this pin will output an active high.
It remains in a low state at all other times.</td></tr>
<tr><td>LOCK</td><td>9
(W91561DLNF, W91563DLNF only)</td><td>I</td><td>The LOCK pin is used to prevent "0" or "9" dialing under PABX system long distance call control. When the first key input after reset is "0" or "9", all the key inputs, including the "0" or "9" key, become invalid, and the chip generates no output.
The telephone is reinitialized by a reset.
The following table describes the functions of the LOCK pin:
<table>
<tr><th>LOCK PIN</th><th>FUNCTION</th></tr>
<tr><td>Floating</td><td>Normal dialing</td></tr>
<tr><td>V_{DD}</td><td>"0", "9" dialing inhibited</td></tr>
<tr><td>V_{SS}</td><td>"0" dialing inhibited</td></tr>
</table></td></tr>
<tr><td>$\overline{\text{HKS}}$</td><td>24</td><td>I</td><td>Hook switch input.
$\overline{\text{HKS}}$ = V_{DD} or floating: On-hook state. Chip in sleeping mode, no operation.
$\overline{\text{HKS}}$ = V_{SS}: Off-hook state. Chip enable for normal operation.
$\overline{\text{HKS}}$ pin is pulled to V_{DD} by internal resistor.</td></tr>
</table>

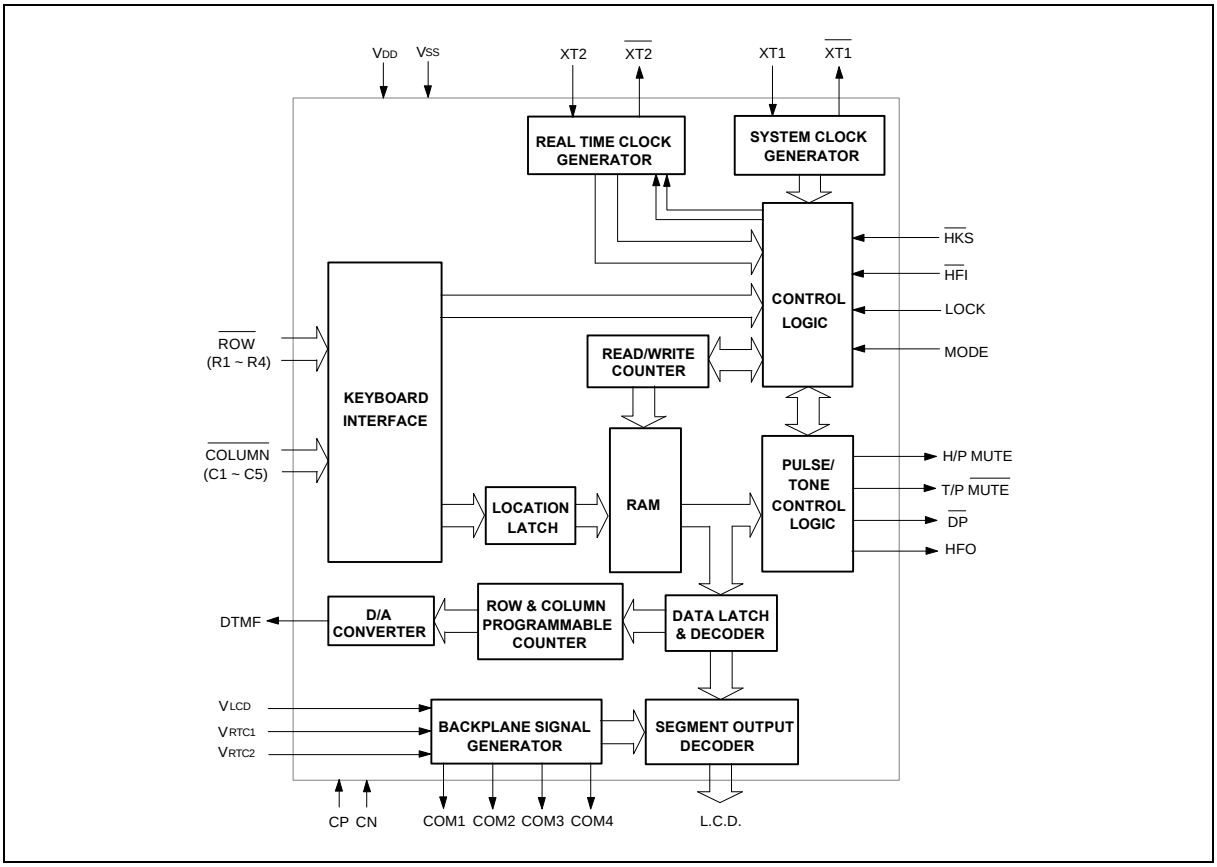
Pin Description, continued

<table>
<tr><th>SYM.</th><th>PIN NO.</th><th>I/O</th><th>FUNCTION</th></tr>
<tr><td>MODE</td><td>12</td><td>I</td><td>Pulling the mode pin to VSS places the dialer in tone mode.
Pulling the mode pin to VDD places the dialer in pulse mode (10 ppS, M/B = 2:3).
Floating the mode pin places the dialer in pulse mode (10 ppS, M/B = 1:2).</td></tr>
<tr><td>$\overline{HFI}$,
HFO</td><td>25, 10</td><td>I, O</td><td>Handfree control pins. A low pulse on the $\overline{HFI}$ input pin toggles the handfree control state.
Status of the handfree control is listed in the following table:
<table>
<tr><th colspan="2">CURRENT STATE</th><th colspan="3">NEXT STATE</th></tr>
<tr><th>Hook SW.</th><th>HFO</th><th>Input</th><th>HFO</th><th>Dialing</th></tr>
<tr><td>–</td><td>Low</td><td>$\overline{HFI}$ ↓</td><td>High</td><td>Yes</td></tr>
<tr><td>On Hook</td><td>High</td><td>$\overline{HFI}$ ↓</td><td>Low</td><td>No</td></tr>
<tr><td>Off Hook</td><td>High</td><td>$\overline{HFI}$ ↓</td><td>Low</td><td>Yes</td></tr>
<tr><td>On Hook</td><td>–</td><td>Off Hook</td><td>Low</td><td>Yes</td></tr>
<tr><td>Off Hook</td><td>Low</td><td>On Hook</td><td>Low</td><td>No</td></tr>
<tr><td>Off Hook</td><td>High</td><td>On Hook</td><td>High</td><td>Yes</td></tr>
</table>
$\overline{HFI}$ pin is pulled to VDD by internal resistor.
Detailed timing diagrams are shown in Figure 4(a), 4(b).</td></tr>
<tr><td>$\overline{DP}$ / $\overline{C6}$</td><td>11</td><td>O</td><td>This pin is a CMOS N-channel open drain output. The flash key will cause $\overline{DP}$ to go active in either pulse mode or tone mode. In lock mode, the $\overline{DP}$ keeps low for 300 mS during off-hook delay time.
The timing diagram is shown as Figure 1(a), 1(b), 1(c), 1(d).</td></tr>
<tr><td>DTMF</td><td>6</td><td>O</td><td>In pulse mode, this pin remains in low state at all times.
In tone mode, it will output a dual or single tone. The detailed timing
diagram for tone mode is shown in Figure 2(a), 2(b), 2(c), 2(d).
<table>
<tr><th colspan="4">Output Frequency</th></tr>
<tr><th></th><th>Specified</th><th>Actual</th><th>Error %</th></tr>
<tr><td>R1</td><td>697</td><td>699</td><td>+0.28</td></tr>
<tr><td>R2</td><td>770</td><td>766</td><td>-0.52</td></tr>
<tr><td>R3</td><td>852</td><td>848</td><td>-0.47</td></tr>
<tr><td>R4</td><td>941</td><td>948</td><td>+0.74</td></tr>
<tr><td>C1</td><td>1209</td><td>1216</td><td>+0.57</td></tr>
<tr><td>C2</td><td>1336</td><td>1332</td><td>-0.30</td></tr>
<tr><td>C3</td><td>1477</td><td>1472</td><td>-0.34</td></tr>
</table></td></tr>
<tr><td>VLCD</td><td>29</td><td>O</td><td>Power supply pin for LCD driver.
A 0.1µF capacitor is connected between VLCD and VSS.</td></tr>
</table>

Pin Description, continued

SYM.	PIN NO.	I/O	FUNCTION
CP, CN	31, 32	I	CP is the voltage control capacitor positive pin. CN is the voltage control capacitor negative pin. A 0.1 μF capacitor is connected between these two pins.
COM1 to COM4	33–36	O	COM1 to COM4 are the common signal output terminals for the 1/4 duty LCD.
SEG1 to SEG32	37–64 1–4	O	SEG1 to SEG32 are the 16-digit segment signal outputs.
XT2, $\overline{XT2}$	26, 27	I, O	A quartz crystal oscillator provides an RTC frequency time base of 32.768 KHz.
V_{RTC1}, V_{RTC2}	28, 30	I	Either V_{RTC1} should be connected to a 1.5V battery and V_{RTC2} should be connected to a capacitor 0.1 μF, which supplies the power source for the RTC.
V_{DD}, V_{SS}	5, 7	I	Power input pins.

BLOCK DIAGRAM



FUNCTIONAL DESCRIPTION

Keyboard Operation

C1	C2	C3	C4	C5	DP / C6	
1	2	3	E	M1	HOLD1	R1
4	5	6	F4	M2	HOLD2	R2
7	8	9	CHK	M3	APSET	R3
*/T	0	#	R/P	RTC/HOUR	SET	R4
F1	F2	F3	OKR	TIM/MIN		Vx

- */T: * in tone mode and P→T in pulse mode
- E: Store digit
- F1, F2, F3, F4: Flash keys
- M1–M3: One-touch memory
- R/P: Redial and pause function key
- OKR: One-key redial function

- RTC: Real time clock toggle key
- TIM: a. Display last calling time
  b. Start and/or stop counting up calling time
- HOUR and MIN: Adjusting time setting keys
- HOLD1, HOLD2: Hold function keys
- APSET: Toggle to set RTC display mode
- SET: Toggle the RTC set function on/off.
- CHK: a. Check dialing number
  b. Check dialing time
  c. Memory check

Notes: D1, ..., Dn, D1', ..., Dn': 0, ..., 9, ∗/T, #
Mn: Direct memory location M1, ..., M3

Normal Dialing

OFF HOOK (or ON HOOK & HFI), D1 , D2 , ..., Dn

1. D1, D2, ..., Dn will be dialed out.
2. Dialing length is unlimited, but redial is inhibited if length oversteps 32 digits in normal dialing.

Redialing

1. OFF HOOK (or ON HOOK & HFI), D1 , D2 , Check Memory (or Number Store), D3 , ..., Dn , Busy, Come ON HOOK , OFF HOOK (or ON HOOK & HFI), R/P

   a. The R/P key can execute the redial function only after the first key-in is off-hook; otherwise, it will invoke the pause function.

   b. The contents of redial memory are D3, …, Dn.

   c. Redial memory can be checked in memory check mode. (CHK , R/P)

   d. If the redialing length oversteps 32 digits, the redialing function will be inhibited.

2. OFF HOOK (or ON HOOK & HFI), D1 , D2 , ..., Dn , Busy, OKR

   a. If the dialing of D1 to Dn is finished, pressing the OKR key causes the pulse output pin to go low for 2.2 seconds (break time) with 0.6 seconds of pause time automatically added.

   b. If the pulses of the dialed D1 to Dn have not finished, OKR will be ignored.

digits [ ] [ ] [ ]

c. The one-key redialing function timing diagram is shown in Figure 3.

3. [OFF HOOK] (or [ON HOOK] & [HFI ī õ_]), [D1] , [D2] , ∗ (or #), [D3] , ..., [Dn] , Busy, Come [ON HOOK] , [OFF HOOK] (or [ON HOOK] & [HFI ī õ_]), [R/P] or [OFF HOOK] (or [ON HOOK] & [HFI ī õ_]), [D1] , [D2] , ∗ (or #), ..., [Dn] , Busy, [OKR]

a. Only D1, D2 will be dialed out for W91564DNF and W91565DNF.

b. D1, D2, ∗ (or #) , D3, ..., Dn will be dialed out for other dialer.

Number Entry

1. [OFF HOOK] (or [ON HOOK] & [HFI ī õ_]), [D1] , [D2] , ..., [Dn] , [E] (many times same as one times), [Mn] , [ON HOOK]

D1, D2, ..., Dn will be stored in memory location Mn and will be dialed out.

2. [OFF HOOK] (or [ON HOOK] & [HFI ī õ_]), [E] , [D1] , [D2] , ..., [Dn] , [E] (could be skipped), [Mn] , [ON HOOK]

a. D1, D2, ..., Dn will be stored in memory location Mn but will not be dialed out.

b. [R/P] and [*/T] keys can be stored as a digit in memory, in store mode, [R/P] is the pause function key.

c. The store mode is released after the store function is executed or when the hook switch is depressed.

4. [OFF HOOK] , [E] , [Mn]

The redial contents excluding memory dialing will be copied to memory location Mn.

5. The key-in number should not exceed 32 digits. If the number exceeds 32 digits, it will not be stored in memory.

Repertory Dialing

One-touch direct repertory dialing.

[OFF HOOK] (or [ON HOOK] & [HFI ī õ_]), [Mn] or [R/P] , [OKR])

Access Pause

OFF HOOK (or ON HOOK & HFI), D1 , D2 , R/P , D3 , ..., Dn , Busy, Come ON HOOK , OFF HOOK (or ON HOOK & HFI), R/P

1. The first R/P functions as a pause key and the second as a first key-in redial key.
2. The pause function can be stored in memory.
3. The pause function is executed in normal dialing, redialing, or memory dialing.
4. The pause duration time is 3.6 Sec. (2.0 Sec. for W91564DNF and W91565DNF only)
5. The pause function timing diagram is shown in Figure 5.

Pulse- to-tone (*/T)

OFF HOOK (or ON HOOK & HFI), D1 , D2 , ..., Dn , */T , D1' , D2' , ..., Dn'

1. If the mode switch is set to pulse mode, then the output signal will be:

   D1, D2, …, Dn, Pause (3.6 sec), D1', D2', …, Dn'
   (Pulse) (Tone)

2. If the mode switch is set to tone mode, then the output signal will be:

   D1, D2, …, Dn, *, D1', D2', …, Dn'
   (Tone) (Tone)

3. The dialer remains in tone mode after the digits have been dialed out and can be reset to pulse mode only by going on-hook.
4. The pulse-to-tone function timing diagram is shown in Figure 6(a), 6(b).

Flash (F = F1, F2, F3, F4)

OFF HOOK (or ON HOOK & HFI), F

1. The dialer will execute flash break time of 600 mS (F1), 300 mS (F2), 73 mS (F3) or 100 mS(F4) and pause time of 1S before the next digit (except flash key) is dialed out.
2. The flash key has first priority in normal dialing but an insert flash can be stored into memory when flash is the first digit in memory. In this condition, only one flash key can be released to the user.
   a. For the digit sequence E, F1, D1, D2, D3, E, Mn, the sequence stored in Mn will be F1, D1, D2, D3.
   b. For the digit sequence E, D1, F1, D2, D3, E, Mn, the sequence stored in Mn will be D1, D2, D3.
   c. For the digit sequence F1, D1, D2, D3, E, Mn, the sequence stored in Mn will be D1, D2, D3.
3. The system will return to the initial state after the flash break time is finished.
4. Keyboard functions are inhibited when flash break is being executed.
5. The flash timing daigram is shown in Figure 7.

HOLD Key

OFF HOOK (or ON HOOK & $\overline{\text{HFI}}$), HOLD1 (or HOLD2)

1.The hold function is toggled on and off by the HOLD1 or HOLD2 key. When the hold function is toggled on, the hold mark (dot of digit_4) will be lit and all key-ins (except hold keys and icon keys) will be ignored.

2. The following examples show the hold function being toggled on and off:

a. OFF HOOK , HOLD1 (or HOLD2), HOLD1 (or HOLD2)

b. OFF HOOK , HOLD1 (or HOLD2), $\overline{\text{HFI}}$

c. OFF HOOK , HOLD1 (or HOLD2), ON HOOK , $\overline{\text{HFI}}$

d. ON HOOK & $\overline{\text{HFI}}$, HOLD1 (or HOLD2), $\overline{\text{HFI}}$

3. HOLD1 and HOLD2 have the same function in the off-hook state. The difference between HOLD1 and HOLD2 are shown as follows:

a. If OFF HOOK , HOLD1 (or HOLD2), ON HOOK , HOLD1 is entered, then the dialer will be off-line.

If OFF HOOK , HOLD1 (or HOLD2), ON HOOK , HOLD2 is entered, then the dialer will be on hold.

b. If ON HOOK & $\overline{\text{HFI}}$, HOLD1 (or HOLD2), HOLD1 is entered, then the dialer will be off-line.

c. If ON HOOK & $\overline{\text{HFI}}$, HOLD1 (or HOLD2), HOLD2 is entered, then the dialer will be on hold.

4. The function timing diagram is shown in Figure 8(a), 8(b), 8(c).

Adjusting Time Setting

OFF HOOK (or ON HOOK & $\overline{\text{HFI}}$), SET , HOUR , MIN , SET (or ON HOOK)

1. Only HOUR and MIN keys are valid in RTC set mode.

2. Hours and minutes count forward as long as the HOUR or MIN key is pressed.

3. The on/off function of SET is tolggled, and the dialer is initialized after the SET key is toggled.

4. If the dialing sequence D1, D2, ..., Dn (including flash and pause) has not finished, SET will be ignored.

RTC Display Mode

OFF HOOK (or ON HOOK & $\overline{\text{HFI}}$), RTC

1.The real time clock display mode can be toggled on and off by the RTC key.

2. The icon display will not change when the RTC display mode is entered and set.

APSET

1. In the off-hook state, press the APSET key to toggle the RTC function to 24-hour clock mode or 12-hour clock with p.m. mode.
2. The default mode is a 12-hour clock with p.m. mode.

Check Key

OFF HOOK (or ON HOOK & HFI), CHK , R/P (or OKR , Mn , ..., etc.)

The contents of redial (or memory) is displayed on the LCD when either R/P or OKR is key in.

TIM

OFF HOOK (or ON HOOK & HFI), D1 , D2 , ..., Dn (or Redialing or Repertory dialing), CONVERSATION

1. If no key is pressed after dialing is finished, the LCD will display a timer after 6 seconds.
2. If the dialing sequence D1, D2, ..., Dn has not finished, TIM will be ignored.
3. The timer will be initialized by the flash and toggle SET key.

Mixed Dialing

1. Definition of mixed dialing:

   In mixed dialing, a new sequence may be pressed after the previous sequence has been sent out completely. The following are examples of mixed dialing:

   Example 1: Normal dialing + Repertory dialing +...

   Example 2: Repertory dialing + Normal dialing + Repertory dialing +...

   Example 3: Redialing + Normal dialing + Repertory dialing +...

2. There is no limitation on the number of digits and sequences in mixed dialing.
3. The content of mixed dialing may be a combination of normal dialing, memory dialing, or one-key redialing.

ABSOLUTION MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
DC Supply Voltage	V_{DD}–V_{SS}	-0.3 to +7.0	V
Input/Output Voltage	V_{IL}	V_{SS} –0.3	V
	V_{IH}	V_{DD} +0.3	
	V_{OL}	V_{SS} –0.3	
	V_{OH}	V_{DD} +0.3	
Power Dissipation	P_D	120	mW
Operating Temperature	T_{OPR}	-0.5 to +70	°C
Storage Temperature	T_{STG}	-55 to +125	°C

Note: Exposure to conditions beyond those listed under Absolute Maximum Ratings may adversely affect the life and reliability of the device.

ELECTRICAL CHARACTERISTICS

DC CHARACTERISTICS

(V_{DD}–V_{SS} = 2.5V. F_{OSC} = 3.58 MHz, T_A = 25° C, all outputs unloaded.)

PARAMETER	SYM.	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V_{DD}	-	2.0	-	5.5	V
Operating Current	I_{OP}	Tone, Unloaded	-	0.5	0.7	mA
		Pulse, Unloaded	-	0.4	0.5	
Standby Current	I_{SB}	$\overline{HKS}$ = 0, Unloaded and no key entry	-	-	15	µA
Memory Retention Current	I_{MR}	$\overline{HKS}$ = 1 V_{DD} = 1.0V	-	-	0.5	µA
Tone Output Voltage	V_{TO}	Row group RL = 10 KΩ	130	150	170	mVrms
Pre-emphasis		Col/Row V_{DD} = 2.0 to 5.5V	-	2	3	dB

DC Characteristics, continued

PARAMETER	SYM.	CONDITIONS	MIN.	TYP.	MAX.	UNIT
DTMF Distortion	THD	RL = 10 KΩ VDD = 2.0 to 5.5V	-	-30	-23	dB
DTMF Output DC Level	VTDC	VDD = 2.0 to 5.5V	1.0	-	3.0	V
DTMF Output Sink Current	ITL	VTO = 0.5V	0.2	-	-	mA
$\overline{DP}$ Output Sink Current	IPL	VPO = 0.5V	0.5	-	-	mA
Common Output Voltage	VCH	VRTC = 1.5V	4.2	4.5	4.8	V
	VCL		-	0	0.3	
Common Output Current	ICH	-	-20	-	-	µA
	ICL	-	20	-	-	
Segment Output Voltage	VSH	VRTC = 1.5V	4.2	4.5	4.8	V
	VSL		-	0	0.3	
Segment Output Current	ISH	-	-5	-	-	µA
	ISL	-	5	-	-	
RMS Voltage	VON	-	2.4	2.6	-	Vrms
Across a Segment	VOFF	-	-	1.5	1.7	
Average DC Offset Voltage	VDC	-	-	-	100	mV
$\overline{HFI}$ High Voltage	VHFIH	-	0.8 VDD	-	VDD	V
$\overline{HFI}$ Low Voltage	VHFIL	-	-	-	0.2 VDD	V
T/P $\overline{MUTE}$ Output Sink Current	ITML	VTMO = 0.5V	0.5	-	-	mA
H/P MUTE Output Drive Current	IHMH	VHMO = 2.0V	0.5	-	-	mA
H/P MUTE Output Sink Current	IHML	VHMO = 0.5V	0.5	-	-	mA
Keypad Input Drive Current	IKD	VI = 0V	4	-	-	µA
Keypad Input Sink Current	IKS	VI = 2.5V	200	-	-	µA
Keypad Resistance	RK	-	-	-	5	KΩ
Control Input Pull Up/Down Resistor	RCIP	$\overline{HFI}$	100	-	-	KΩ
$\overline{HKS}$ Input Pull High Resistor	RHK	-	-	500	-	KΩ

AC CHARACTERISTICS

(V_{DD}–V_{SS} = 2.5V , $F_{OSC.}$ = 3.58 MHz , T_A = 25° C, all outputs unloaded.)

PARAMETER	SYM.	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Key-in Debounce	T_{KID}	-	-	20	-	mS
Key Release Debounce	T_{KRD}	-	-	20	-	mS
Off-hook Delay Time	T_{OFD}	-	-	300	-	mS
First Key-in Delay Time	T_{FKD}	-	-	300	-	mS
On-hook Debounce Time	T_{OHD}	Unlock	-	150	-	mS
		Lock	-	20	-	
Pulse Mute Delay	T_{MD}	Mode = V_{DD}	-	40	-	mS
		Mode = Floating	-	33.3	-	
Pre-digit-pause (10 ppS)	T_{PDP}	Mode = V_{DD}	-	40	-	mS
		Mode = Floating	-	33.3	-	
Inter-digit Pause (Auto Dialing)	T_{IDP}	10 ppS	-	800	-	mS
Make/Break Ratio	M:B	Mode = V_{DD}	-	40:60	-	%
		Mode = Floating	-	33:67	-	
Tone Output Duration	T_{TD}	-	-	87	-	mS
		W91564DNF and W91565DNF only	-	81	-	
Inter-tone Pause	T_{ITP}	-	-	87	-	mS
Flash Break Time	T_{FB}	F1	-	600	-	mS
		F2	-	300	-	
		F3	-	73	-	
		F4	-	100		
Flash Pause Time	T_{FP}	F1, F2, F3, F4	-	1	-	S
Pause Time	T_P	R/P	-	3.6	-	S
		W91564DNF and W91565DNF only		2.0		
One Key Redialing Break Time	T_{RB}	-	-	2.2	-	S
One Key Redialing Pause Time	T_{RP}	-	-	0.6	-	S
LCD Frame Frequency	F_{LCD}	-	-	32	-	Hz

RTC DC Characteristics

(V_{RTC} = 1.5V ,V_{SS} = 0V , $F_{OSC.}$ = 32,768 Hz , T_A = 25° C, all outputs unloaded.)

PARAMETER	SYM.	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{RTC}	-	1.2	1.5	1.8	V
Supply Current	I_{RTC}	No Load	-	2.0	4.0	µA
OSC. Starting Time	T_{OSC}	-	-	-	3	S
OSC. Output Built-in Cap.	C_O	Cl = 12.5 pF	-	25	-	pF
OSC. in Trimmer Cap.	C_{TRIM}	-	5	-	35	pF
Frequency Stability	Δf/f	V_{DD}–V_{SS} = 1.3 to 1.6V	-	-	1	PPM

Notes :

1. Crystal parameters suggested for proper operation are Rs < 100 ohms, Lm = 96 mH, Cm = 0.02 pF, Cn = 5 pF, Cl = 18 pF, and Fosc. = 3.579545 MHz ±0.02%

2. Crystal oscillator accuracy directly affects these times.

TIMING WAVEFORMS

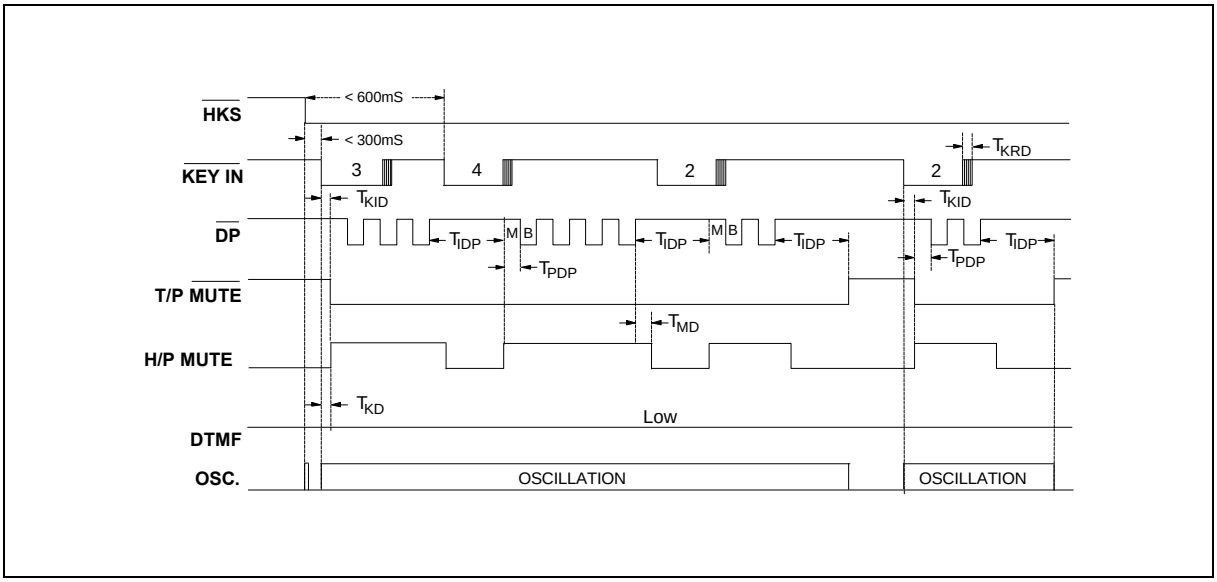


Figure 1(a). Normal Dialing Timing Diagram (Pulse Mode without Lock Function)

Timing Waveforms, continued

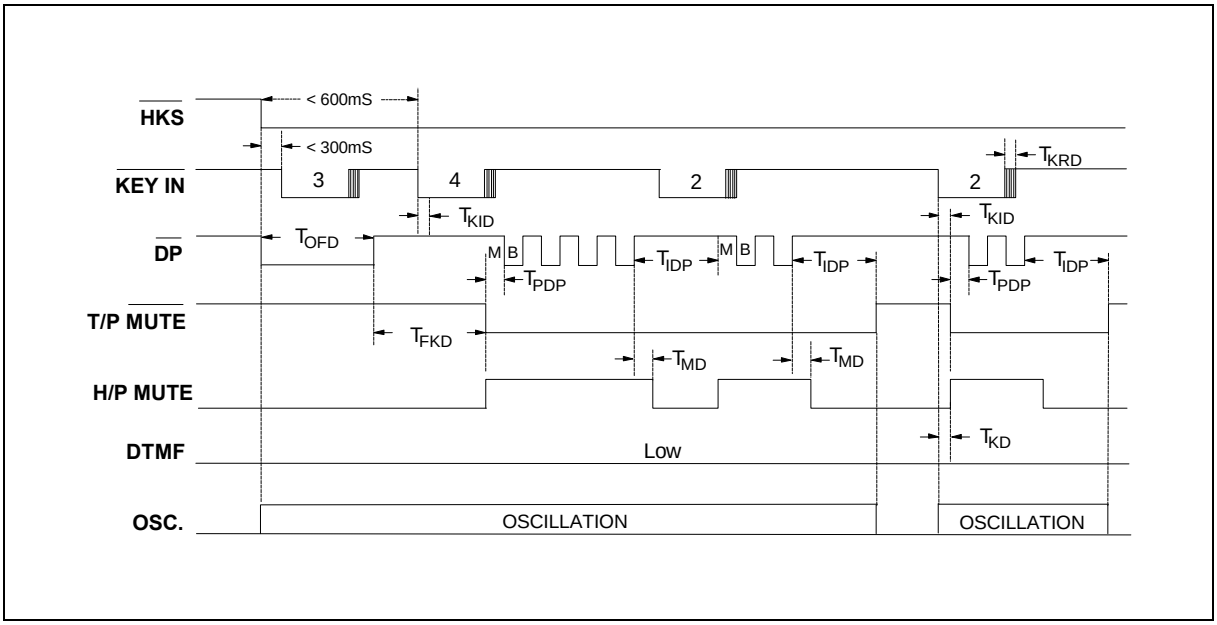


Figure 1(b). Normal Dialing Timing Diagram (Pulse Mode with Lock Function)

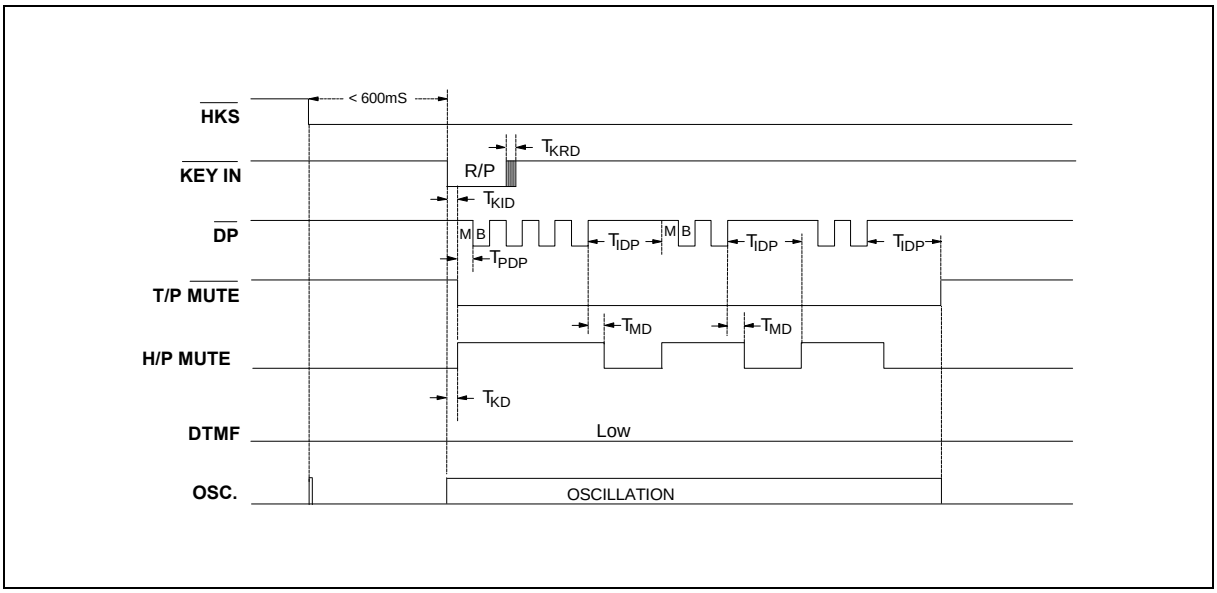


Figure 1(c). Auto Dialing Timing Diagram (Pulse Mode without Lock Function)

Timing Waveforms, continued

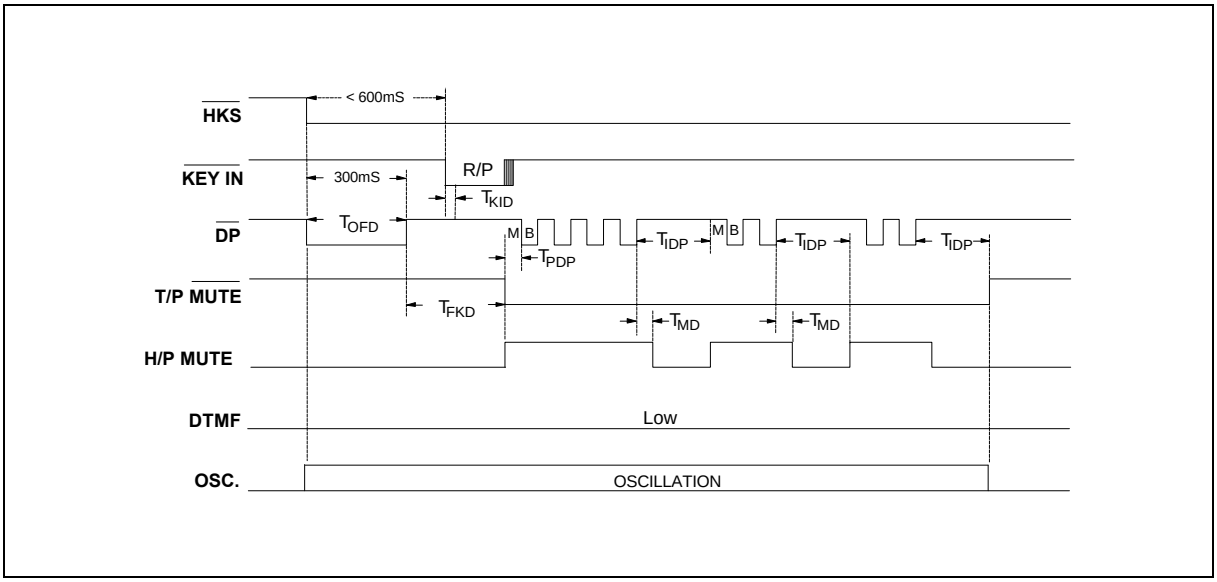


Figure 1(d). Auto Dialing Timing Diagram (Pulse Mode with Lock Function)

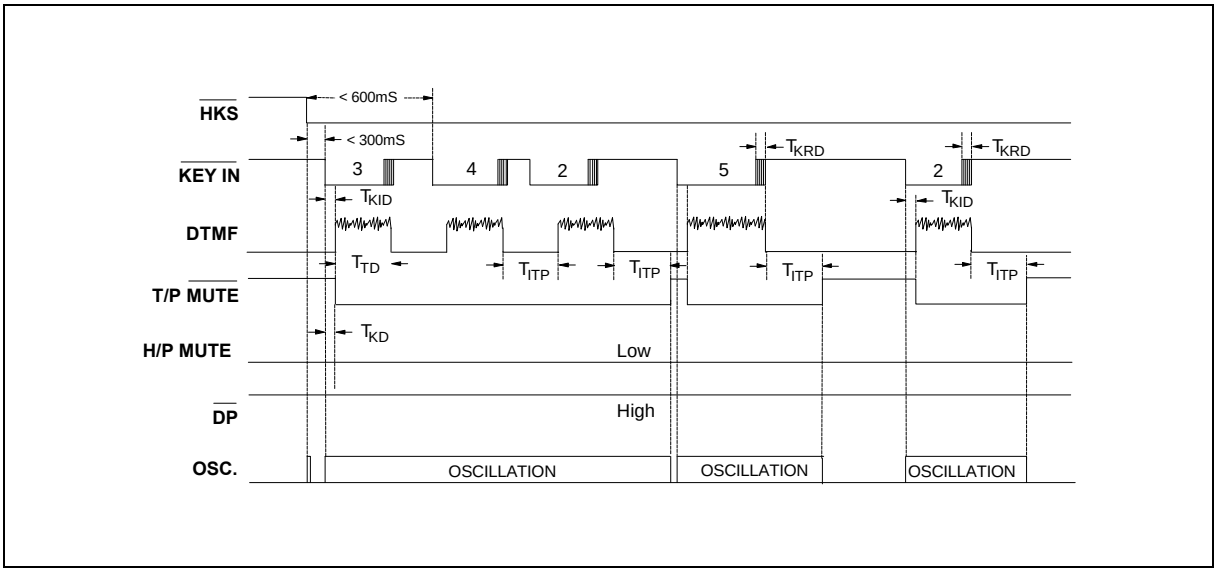


Figure 2(a). Normal Dialing Timing Diagram (Tone Mode without Lock Function)

Timing Waveforms, continued

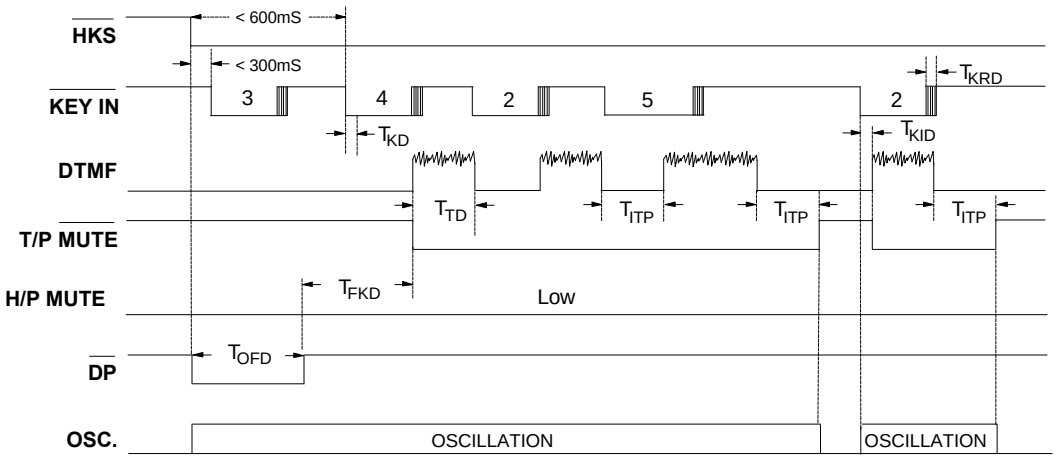


Figure 2(b). Normal Dialing Timing Diagram (Tone Mode with Lock Function)

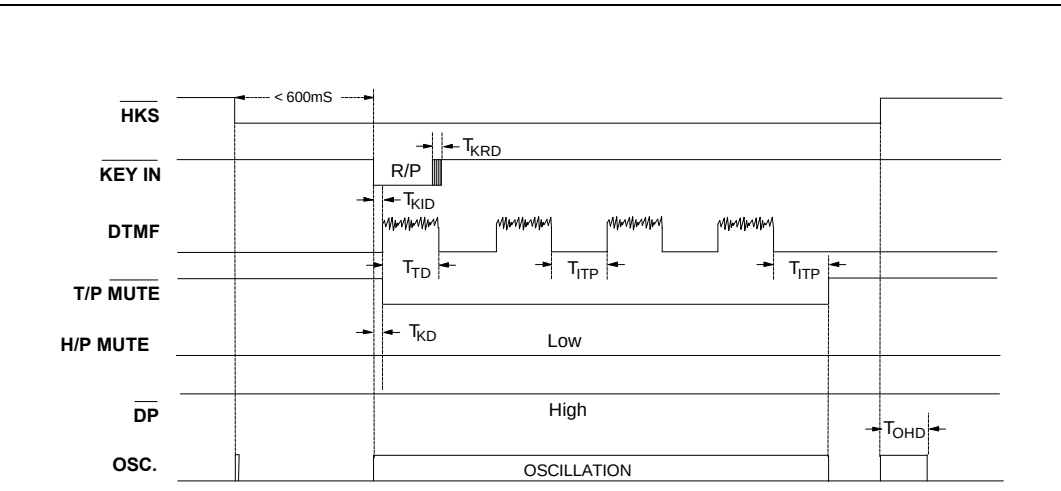


Figure 2(c). Auto Dialing Timing Diagram (Tone Mode without Lock Function)

Timing Waveforms, continued

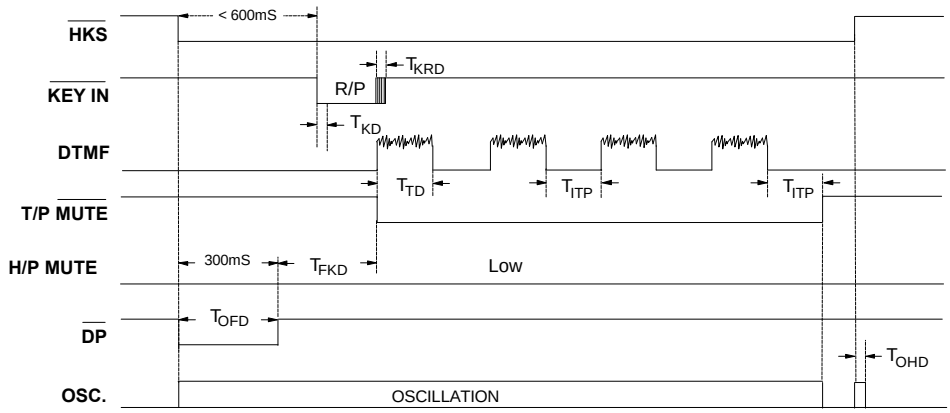


Figure 2(d). Auto Dialing Timing Diagram (Tone Mode with Lock Function)

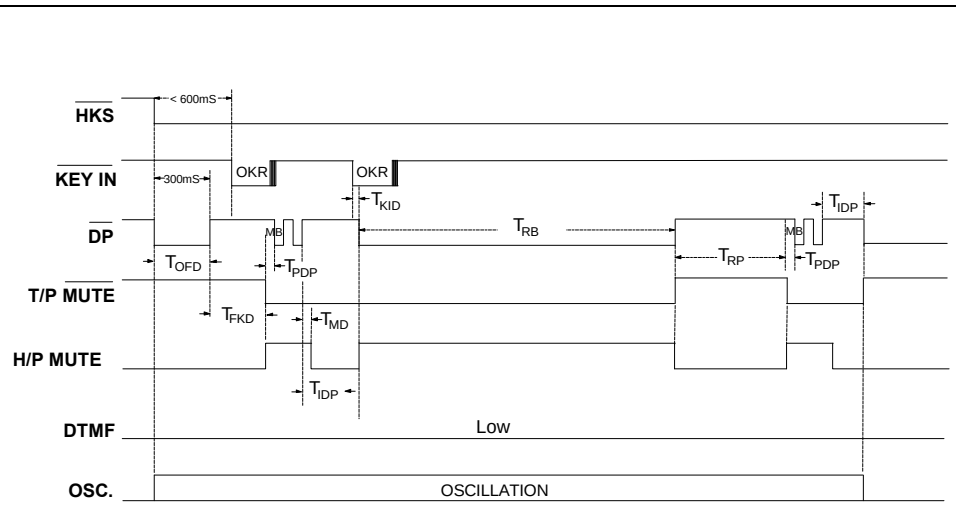


Figure 3. One-key Redial Timing Diagram

Timing Waveforms, continued

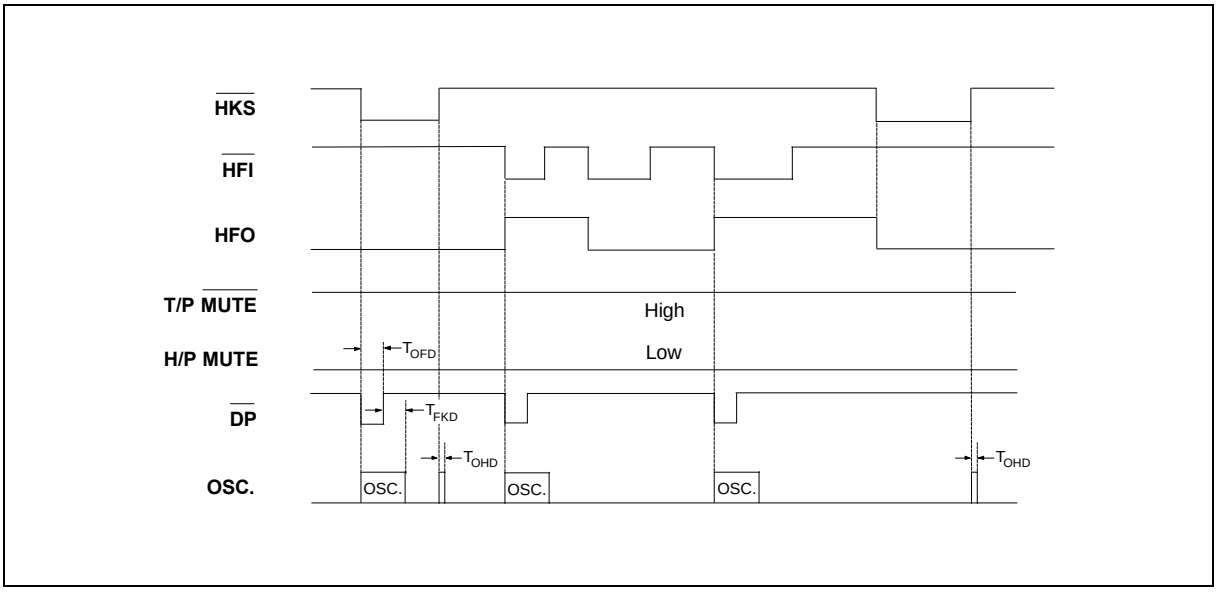


Figure 4(a). Handfree Timing Diagram (with Lock Function)

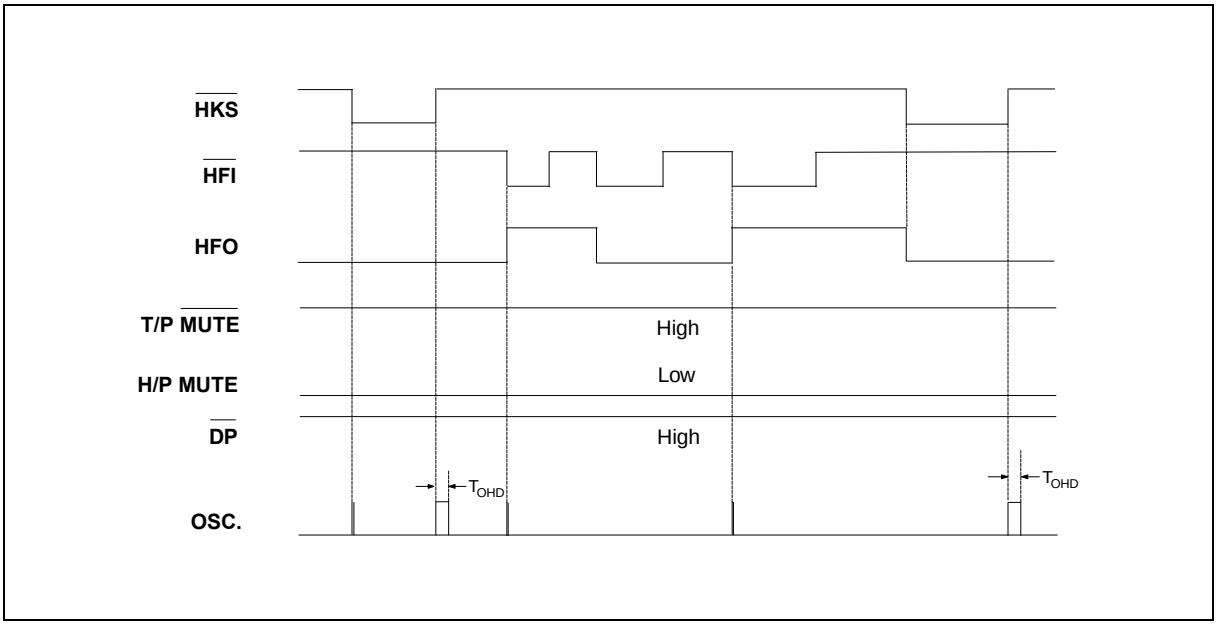


Figure 4(b). Handfree Timing Diagram (without Lock Function)

Timing Waveforms, continued

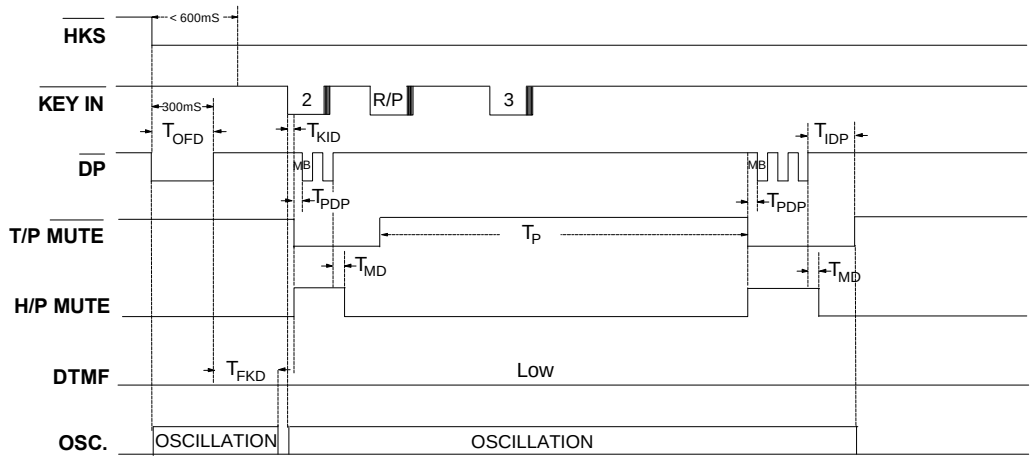


Figure 5. Pause Function Timing Diagram (Pulse Mode)

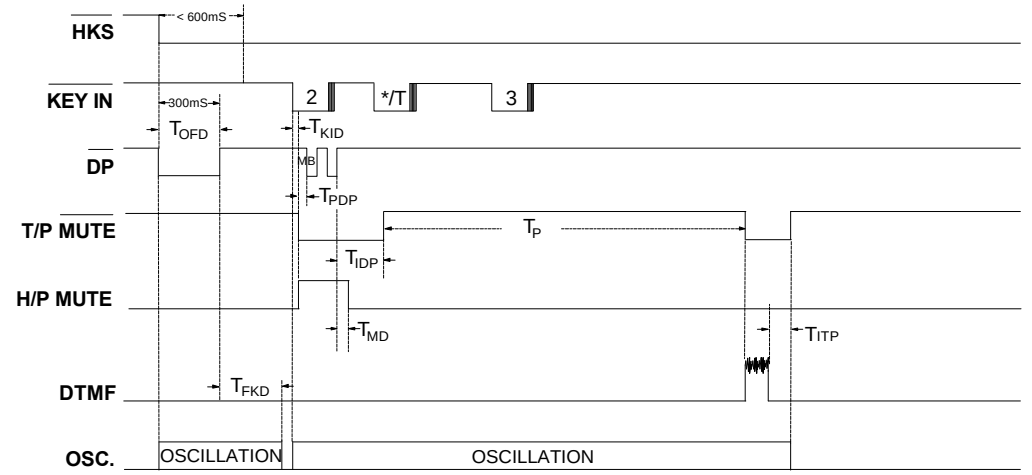


Figure 6(a). Pulse-to-tone Timing Diagram

Timing Waveforms, continued

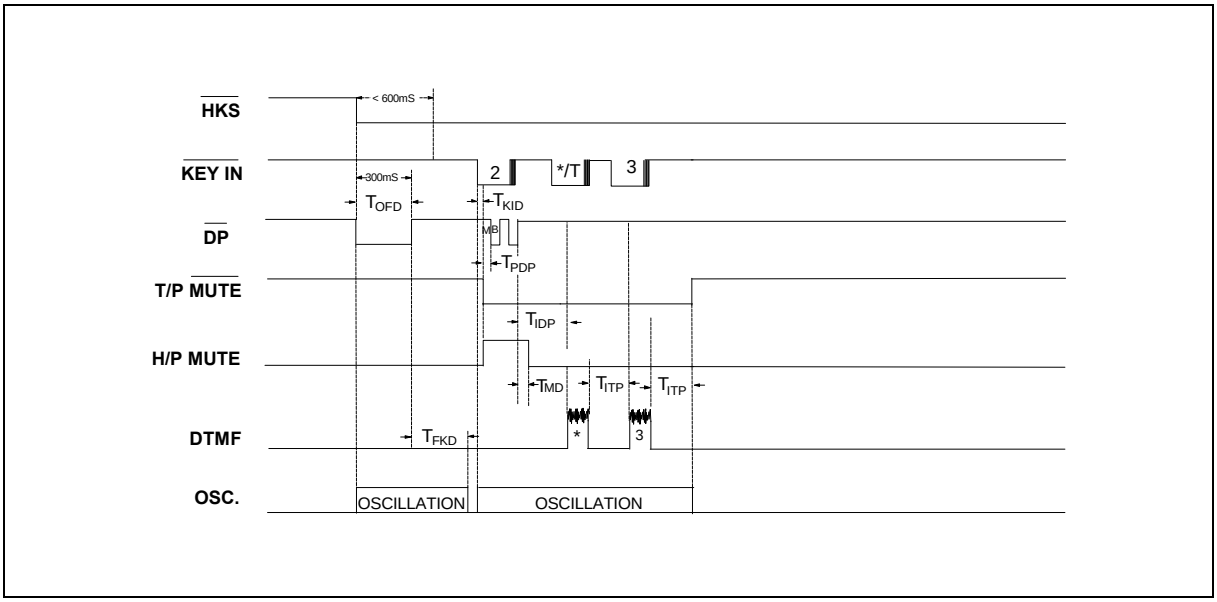


Figure 6(b). Pulse-to-tone Timing Diagram (W91564DNF and W91565DNF only)

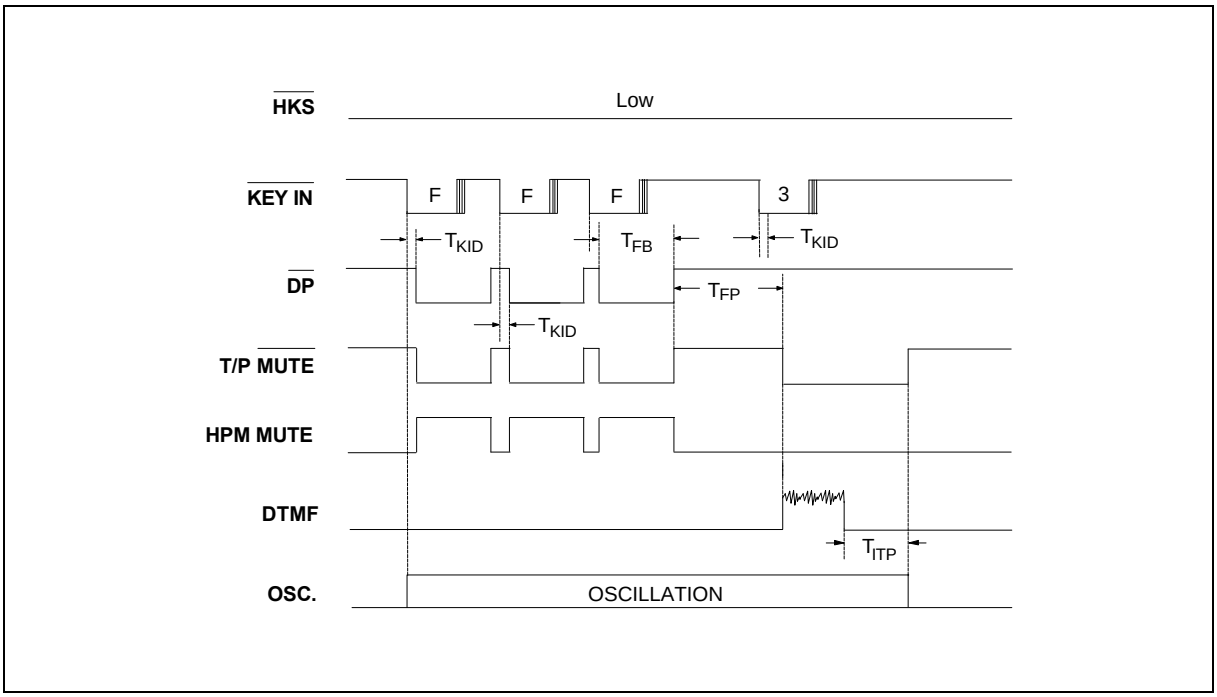


Figure 7. First Priority Flash Timing Diagram

Timing Waveforms, continued

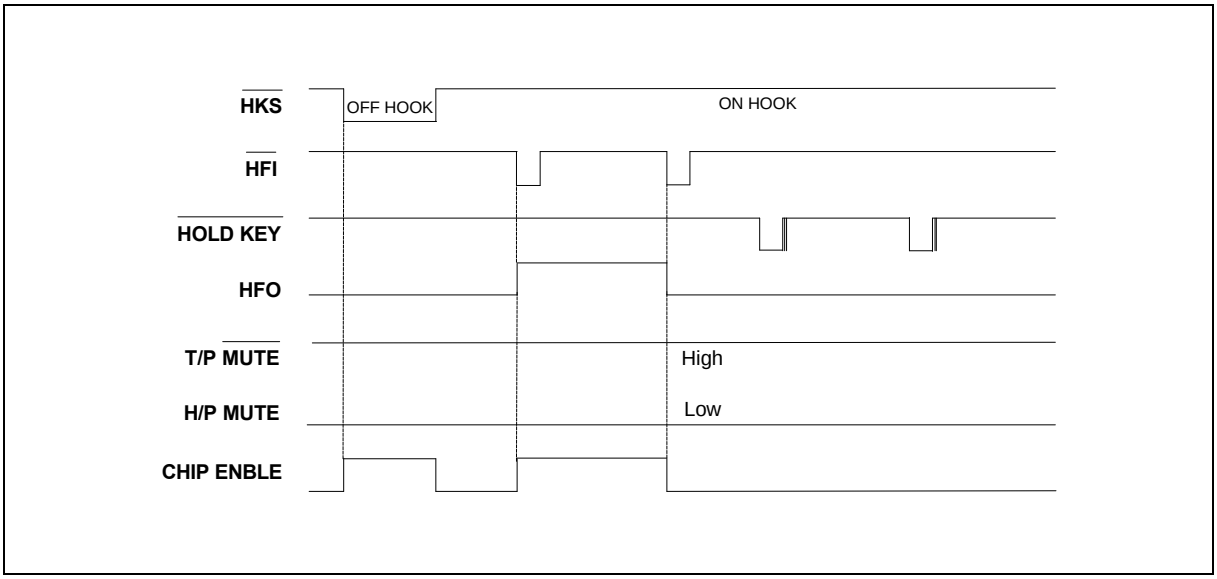


Figure 8(a). Hold and Handfree Timing Diagram

Note: The $\overline{\text{HOLD KEY}}$ cannot be enabled when the chip is disabled.

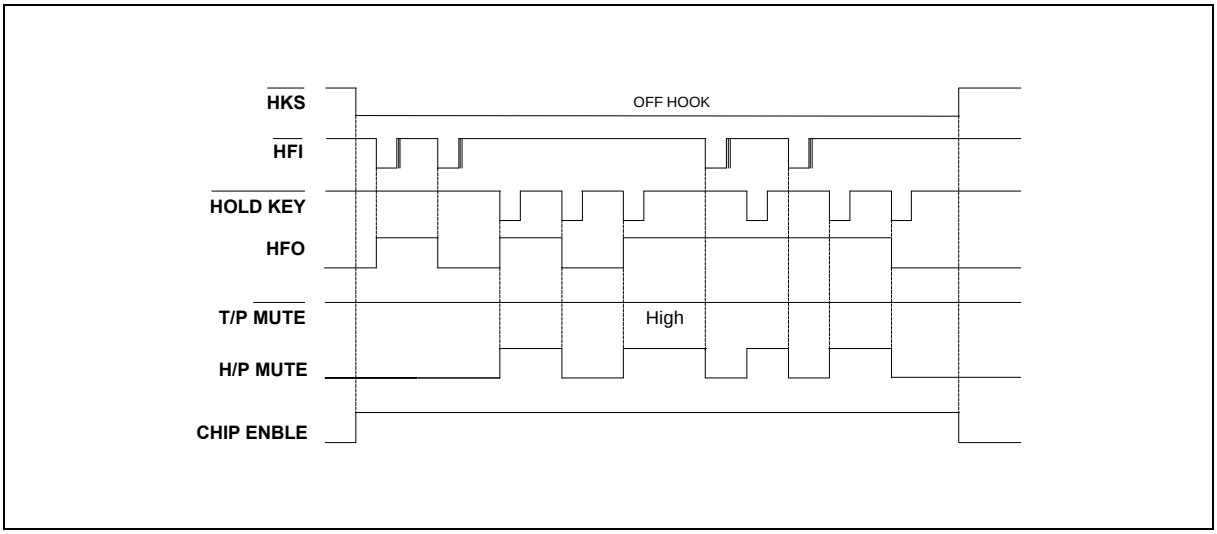


Figure 8(b). Hold and Handfree Timing Diagram

Note: The $\overline{\text{HFI}}$ and $\overline{\text{HOLD KEY}}$ inputs will toggle the HFO signal; as soon as either $\overline{\text{HFI}}$ or $\overline{\text{HOLD KEY}}$ is activated, the HFO signal will go high and previous activated inputs will be ignored.

Timing Waveforms, continued

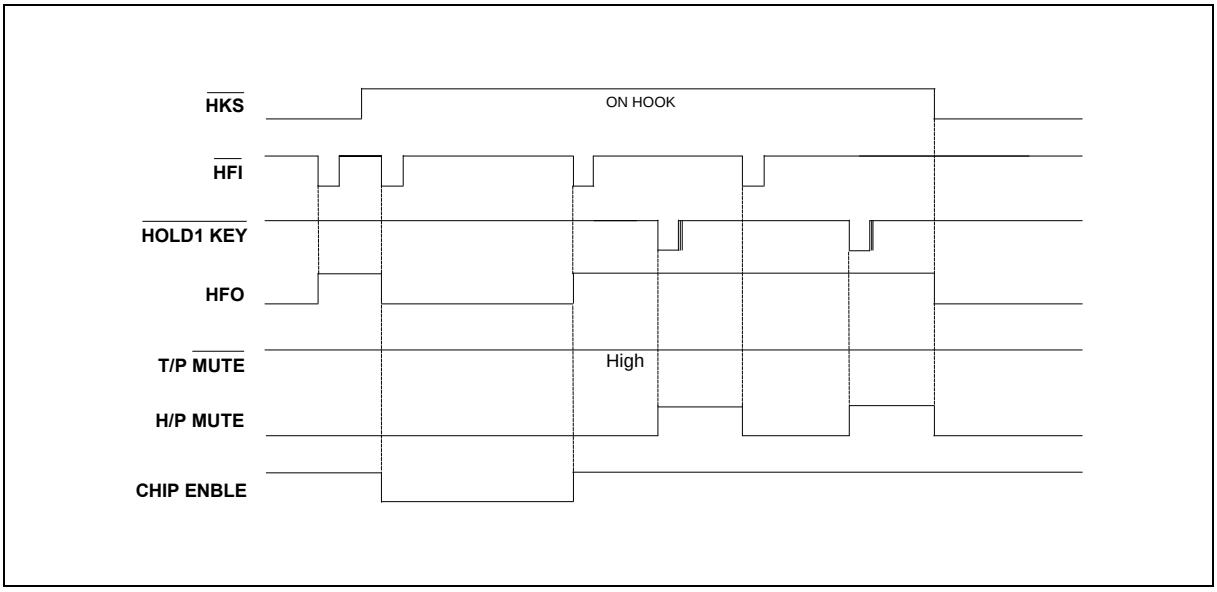
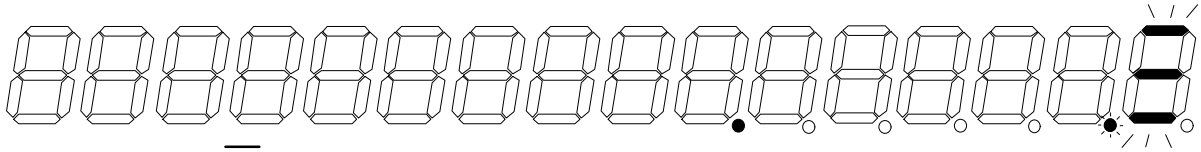


Figure 8(c). Hold and Handfree Timing Diagram

Note: Changing the state of the $\overline{\text{HKS}}$ signal from high to low will initialize the HFO and H/P MUTE signals.

LCD DISPLAY FORMAT

A. Normal Dialing



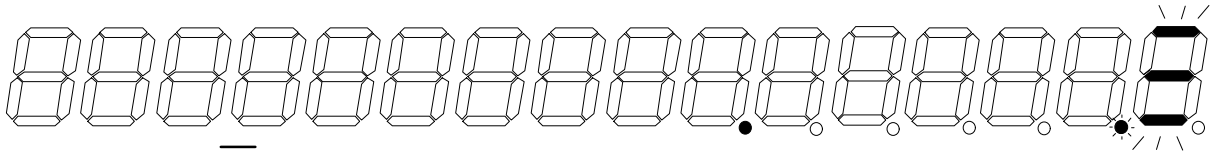
Off hook or press "$\overline{\text{HFI}}$" switch
(Here tone mode was selected).

Blinking

Dial " 0123456789123456"

and "78"

B. Redialing, Memory Dialing, One Touch Dialing

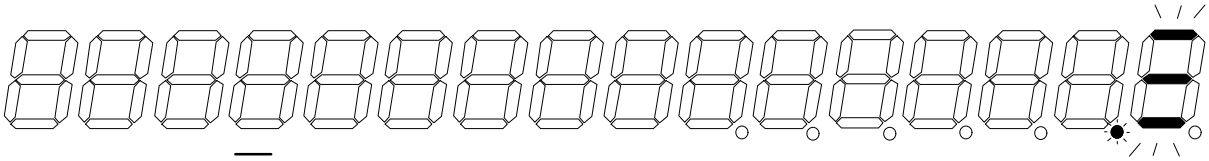


Off hook or press "$\overline{\text{HFI}}$" switch
(Here tone mode was selected).

Blinking

Press "R/P", "OKR" or "Mn" key
(Redial or Mn = "8123456789")

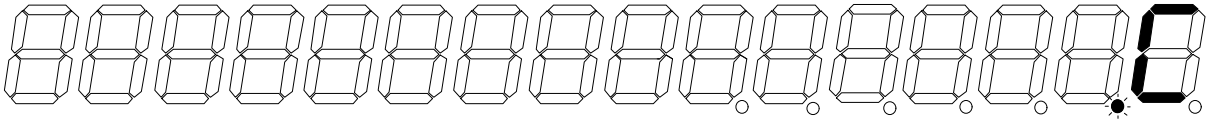
C. Memory Check



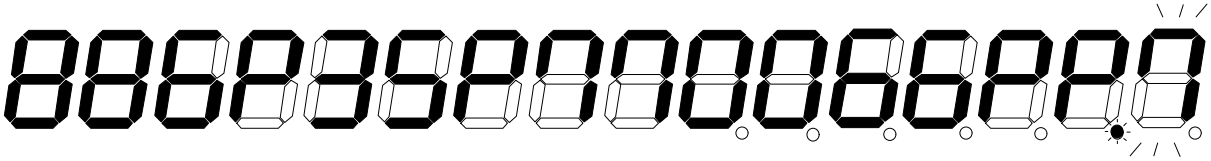
Off-hook or press "$\overline{\text{HFI}}$" switch

Blinking

(M1= "886P35P770066PP7126", and here pulse mode was selected)



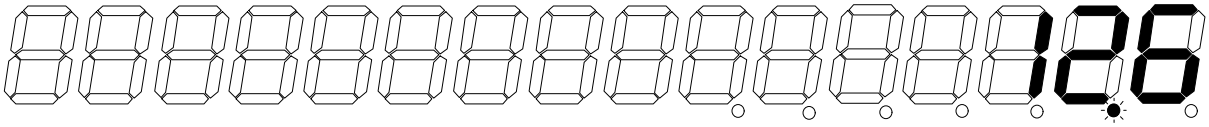
Press "CHK" key



Press "M1" key

Blinking

(Display 1 to 16 digits)

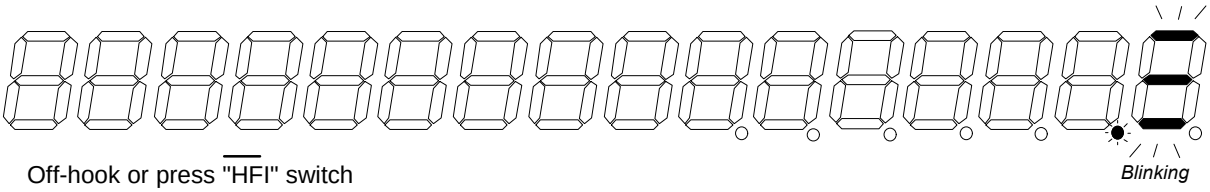


Press "any key"

(Display 17 to 19 digits)

D. Timer Function

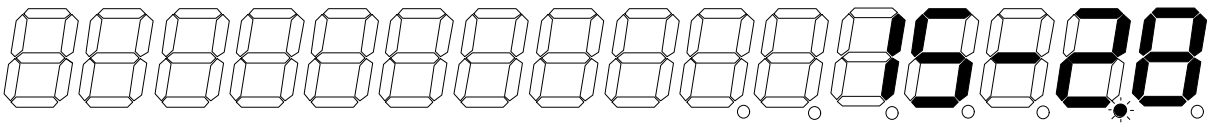
a.



Off-hook or press "$\overline{\text{HFI}}$" switch

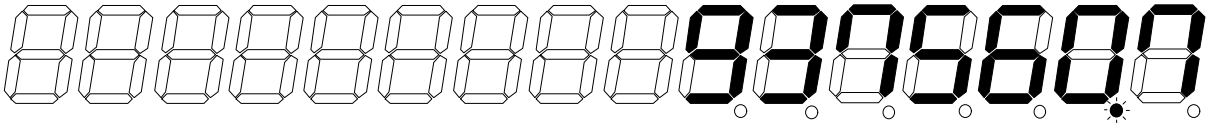
Blinking

(here pulse mode was selected)

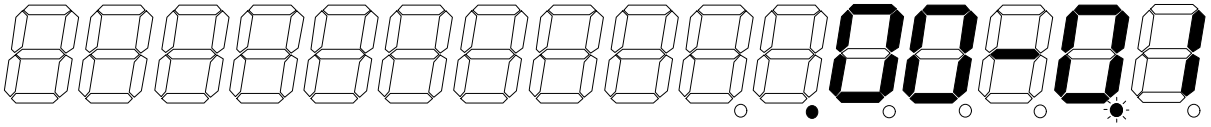


Press "TIM" key

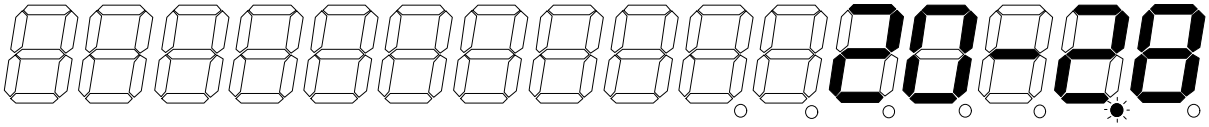
(Display last calling time)



Dial "9375607"

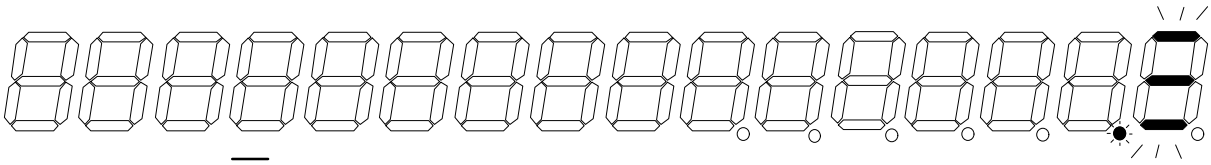


If "9375607" is dialed comlepted, the system will start timer after 6 seconds
(Timer will start counting up)

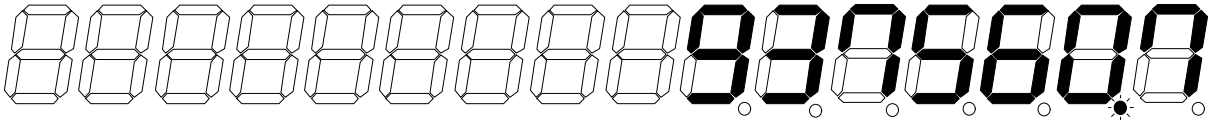


Press "TIM" key
(Timer will stop)

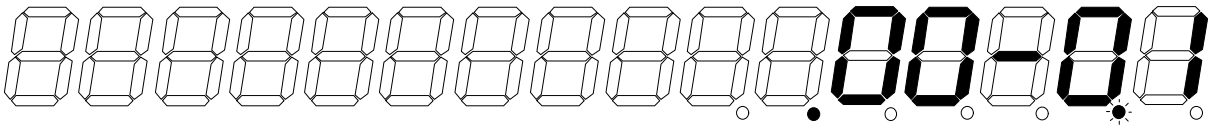
b.



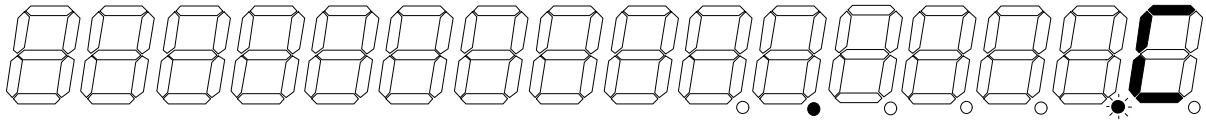
Off-hook or press "$\overline{\text{HFI}}$" switch
(here pulse mode was selected)



Dial "9375607"

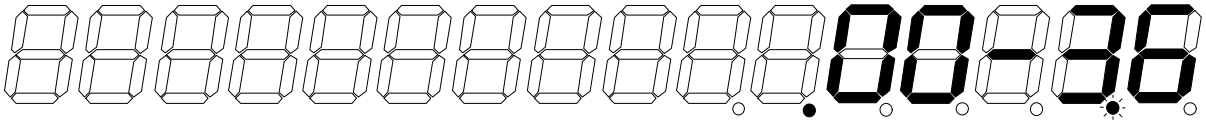


If "9375607" is dialed completed
press "TIM" key
(Timer will start counting up)

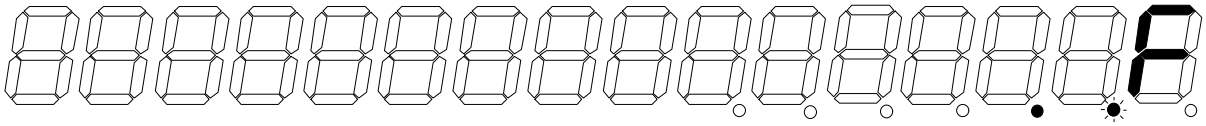


Press "CHK" key
(M2 = "314P4430256")

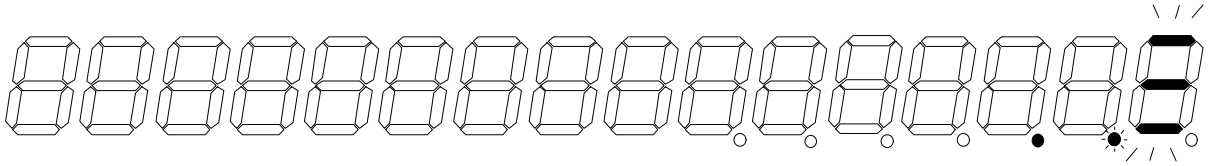
Press "M2" key



The system will go back to timer mode after 6 seconds
(Timer count up continuously)

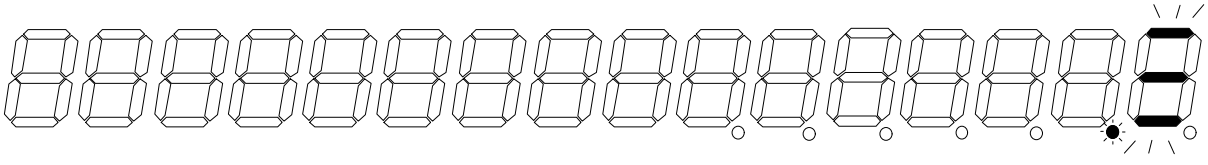


Press "F1", "F2", "F3" or "F4" key
(The timer will stop and the LCD will display a flash mark and flash pattern)



After the flash break is executed

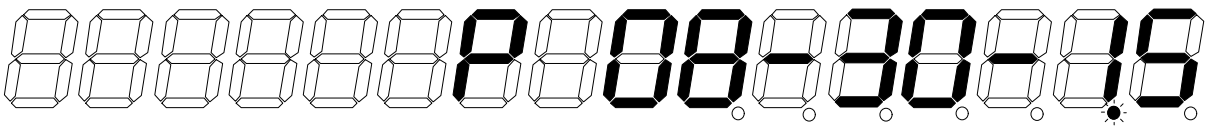
Blinking



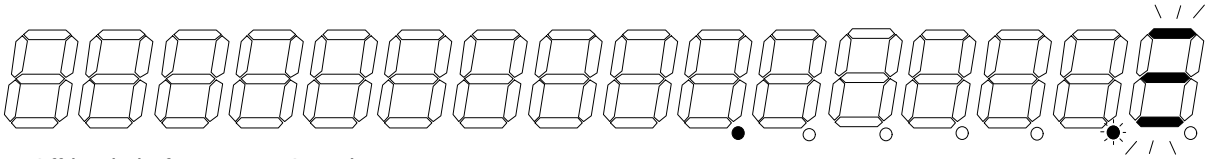
After the flash pause is executed

Blinking

E. RTC Setting Function

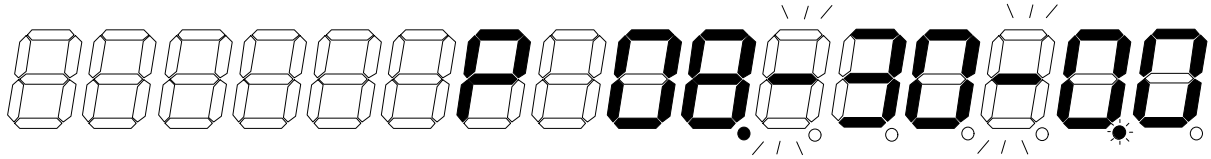


On-hook
(Display real time)

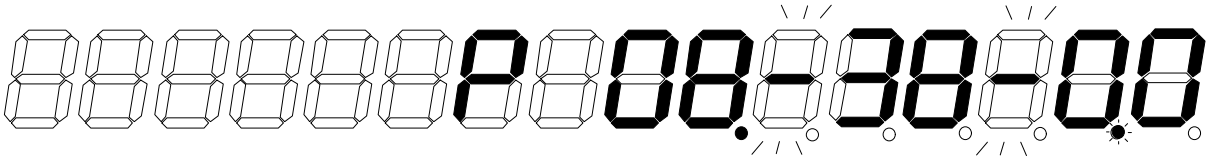


Off-hook, before press "SET" key
(Here tone mode was selected)

Blinking

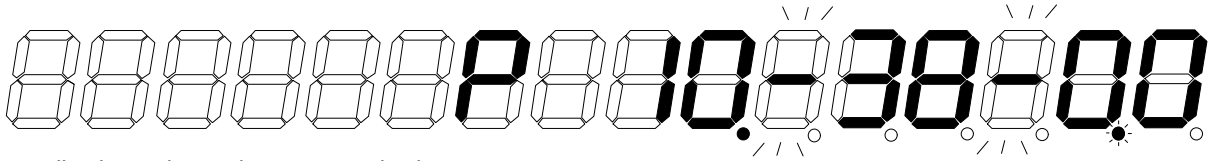


Entering "Setting Mode" (Press "SET" key)

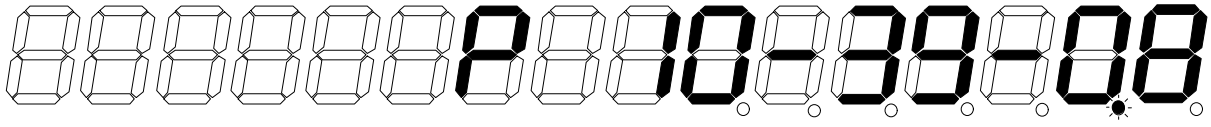


Adjusting "Hour" (Press "HOUR" key)
(Hour counts forward while the key is depressed)

Blinking

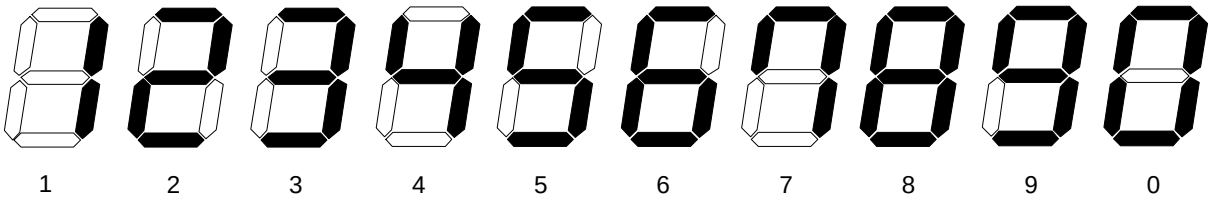


Adjusting "Minute" (Press "MIN" key)
(Minute counts forward while the key is depressed)

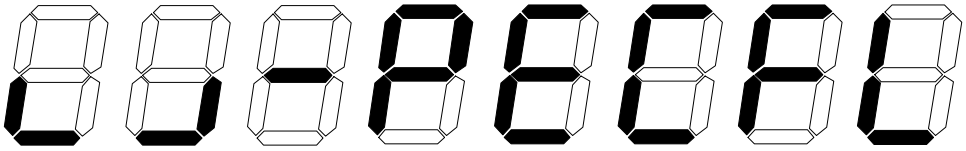


On-hook or press "SET" key (Toggle)
(Here on-hook was selected)

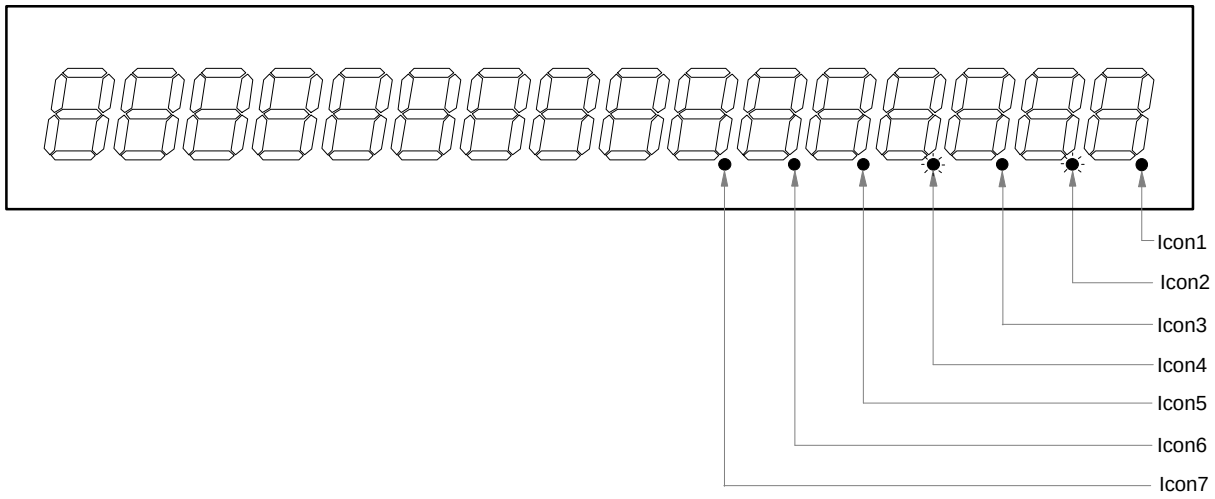
LCD PATTERN FOR DATA



1 2 3 4 5 6 7 8 9 0



* # P→T P E CHECK F LOCK



Notes:

Icon1: Pause

Icon2: The icon will be blinking after power on.

Icon3: Flash

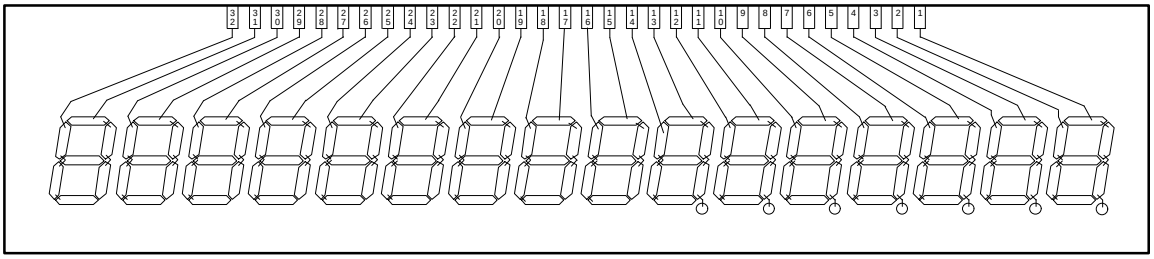
Icon4: Hold

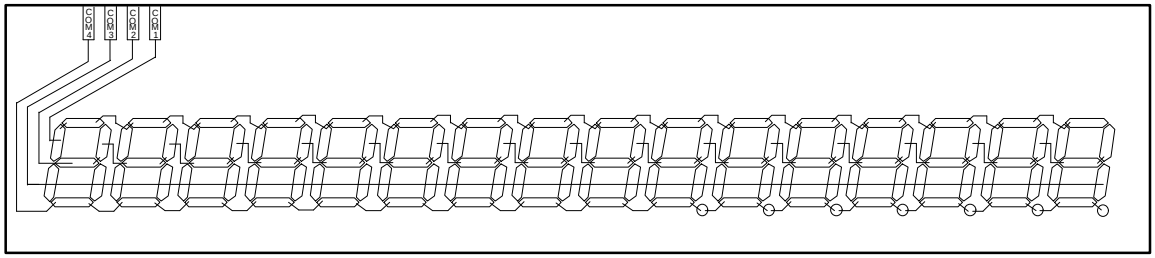
Icon5: Handfree

Icon6: Timer

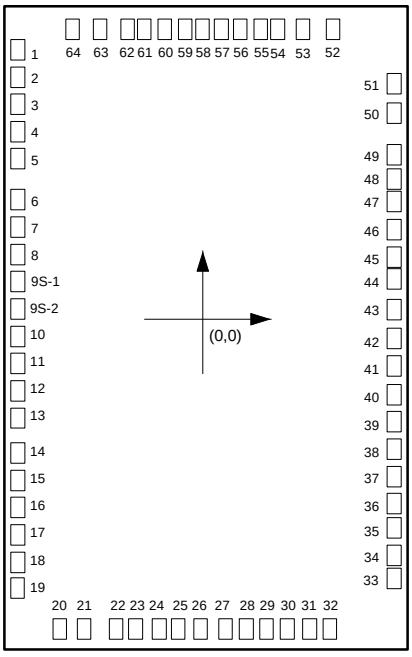
Icon7: Tone

LCD PANEL PATTERN





BONDING PAD DIAGRAM



Notes:

1. The substrate must be connected to Vss.

2. The chip size is 2940 × 3630 μm^2

Pad List

PAD NO.	PAD NAME	PIN NO.	X	Y	PAD NO.	PAD NAME	PIN NO.	X	Y
1	SEG29	1	-1335.00	1430.70	33	OCM1	33	1335.00	-1307.90
2	SEG30	2	-1335.00	1294.50	34	COM2	34	1335.00	-1166.10
3	SEG31	3	-1335.00	1158.50	35	COM3	35	1335.00	-1024.30
4	SEG32	4	-1335.00	1022.30	36	COM4	36	1335.00	-882.50
5	V_{DD}	5	-1335.00	883.40	37	SEG1	37	1335.00	-746.30
6	DTMF	6	-1335.00	665.20	38	SEG2	38	1335.00	-607.50
7	V_{SS}	7	-1335.00	515.50	39	SEG3	39	1335.00	-471.30
8	T/P $\overline{\text{MUTE}}$	8	-1335.00	373.50	40	SEG4	40	1335.00	-335.30
9S-1	H/P MUTE	9*	-1335.00	229.30	41	SEG5	41	1335.00	-199.10
9S-2	LOCK	9*	-1335.00	88.20	42	SEG6	42	1335.00	-63.00
10	HFO	10	-1335.00	-49.80	43	SEG7	43	1335.00	73.00
11	$\overline{\text{DP}}$ / $\overline{\text{C6}}$	11	-1335.00	-191.80	44	SEG8	44	1335.00	209.20
12	MODE	12	-1335.00	-327.80	45	SEG9	45	1335.00	345.20
13	COL1	13	-1335.00	-467.80	46	SEG10	46	1335.00	481.40
14	COL2	14	-1335.00	-627.20	47	SEG11	47	1335.00	617.40
15	COL3	15	-1335.00	-769.20	48	SEG12	48	1335.00	753.60
16	COL4	16	-1335.00	-928.60	49	SEG13	49	1335.00	889.60
17	COL5	17	-1335.00	-1070.60	50	SEG14	50	1335.00	1102.10
18	ROW1	18	-1335.00	-1226.40	51	SEG15	51	1335.00	1270.80
19	ROW2	19	-1335.00	-1368.40	52	SEG16	52	941.30	1657.50
20	ROW3	20	-1080.40	-1679.90	53	SEG17	53	749.00	1657.50
21	ROW4	21	-841.70	-1679.90	54	SEG18	54	534.80	1657.50
22	XT1	22	-598.40	-1679.90	55	SEG19	55	398.60	1657.50
23	$\overline{\text{XT1}}$	23	-453.20	-1679.90	56	SEG20	56	262.60	1657.50
24	HKS	24	-307.90	-1679.90	57	SEG21	57	126.40	1657.50
25	HFI	25	-167.90	-1679.90	58	SEG22	58	-9.60	1657.50
26	XT2	26	24.20	-1679.90	59	SEG23	59	-145.80	1657.50
27	$\overline{\text{XT2}}$	27	188.80	-1679.90	60	SEG24	60	-281.80	1657.50
28	VRTC1	28	326.30	-1679.90	61	SEG25	61	-418.00	1657.50
29	VLCD	29	488.50	-1679.90	62	SEG26	62	-554.00	1657.50
30	VRTC2	30	636.30	-1679.90	63	SEG27	63	-757.70	1657.50
31	CN	31	798.50	-1679.90	64	SEG28	64	-932.00	1657.50
32	CP	32	946.30	-1679.90					

Note: * is bonding option.

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Note: All data and specifications are subject to change without notice.